

Staff Report
on
Mitigation Guidelines

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FOREWORD

For almost 15 years the San Francisco Bay Conservation and Development Commission has required that Bay fill project permittees offset the unavoidable adverse impacts of fill in San Francisco Bay under authority of the McAteer-Petris Act, the Commission's enabling legislation, the Suisun Marsh Preservation Act, and the San Francisco Bay Plan. However, a written statement reflecting that policy was not included in the Bay Plan until March, 1985. The Commission included the policy in the Bay Plan to provide guidance at early project stages to permit applicants, members of the public, and other public agencies. To provide applicants with further, more specific guidance, the Commission determined that a mitigation guidebook should be prepared that would describe the general forms of mitigation the Commission has required for Bay fill projects in the past, describe potential mitigation sites around the Bay, and identify Bay Area organizations and public agencies that could assist permit applicants with mitigation projects.

This report reviews all past Commission actions involving mitigation in its permit process and describes how the Commission has applied its mitigation policy for each type of Bay fill it has authorized. Based on this analysis, general mitigation guidelines are proposed for each kind of Bay fill, i.e., floating, submerged, pile-supported, and solid earth fill. The staff recommends that these guidelines be published in a separate, brief, easily-read guidebook that will assist the reader in determining when, how much, and what kind of mitigation is likely to be required by the Commission for a particular type of Bay fill project.

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INTRODUCTION

Mitigation

Mitigation, as used in this report, refers to any action taken to avoid, reduce, or offset the unavoidable adverse environmental impacts from Bay fill that affect Bay resources such as fish and wildlife habitat, water quality, or water circulation, volume, and surface area. It encompasses such diverse actions as limiting construction to certain times of the year to avoid interfering with spawning herring as well as the conversion of dry land into new tidal marsh. Mitigation must actually lessen the adverse impacts. For example, dedicating an existing tidal marsh to a public agency does not constitute mitigation for a project that destroys tidal marsh because the change in ownership has no net effect on the habitat value of tidal marshes. Only if the change in ownership can directly be related to changes in management practices that specifically improve wildlife habitat can it be considered mitigation. Similarly, providing public access does not constitute mitigation for fill in the Bay.

Background

The San Francisco Bay Conservation and Development Commission's San Francisco Bay Plan and its law, the McAteer-Petris Act, allow the Commission to approve some Bay fill for water-oriented uses (such as ports, water-related industry, and water-oriented recreation) provided that the "public benefits from fill clearly exceed public detriment from the loss of the water areas...." Bay fill can have unavoidable adverse impacts on the Bay and cumulatively,

authorized fills would reduce the size of the Bay. Given the 40 percent reduction in the size of the Bay that has already taken place since the mid-1800s, the Legislature determined that any significant further reduction would be undesirable. Therefore, the Commission requires mitigation to offset the adverse impacts of fill projects. Mitigation, as used by the Commission, consists of both avoidance of adverse environmental impacts (such as limiting construction to certain times of the year to avoid migratory waterfowl) and compensation when such avoidance is not possible (such as enhancements to the wildlife value of other areas, or restoration of an equivalent or greater area to tidal action thereby increasing the Bay tidal prism). The need for and the amount of mitigation has always been determined on an individual project basis, taking into account the specific impacts of the project.

Legal Authority

For its authority to require mitigation, the Commission relies primarily on the McAteer-Petris Act, the Suisun Marsh Preservation Act, and the San Francisco Bay Plan. In certain circumstances the California Environmental Quality Act and the public trust provide additional authority to the Commission.

Under the McAteer-Petris Act the Commission may permit some Bay fill only if the fill project is either a water-oriented use as defined in the Act or the fill is necessary to improve shoreline appearance or increase public access to the Bay. Further, in addition to other requirements, the McAteer-Petris Act requires the Commission to find that the public benefits of the project clearly outweigh the detriments caused by any Bay fill. Both the Act and the Bay Plan require that filling be avoided wherever possible and,

where unavoidable, that the fill be the minimum necessary to accomplish the project. In order to make the legal findings necessary to authorize new development requiring fill, the Commission has occasionally found it necessary to require mitigation to assure that the public benefits of the fill clearly offset the adverse impacts of the fill.

The California Environmental Quality Act (CEQA) is explicit on the need to mitigate for specific significant adverse environmental impacts. CEQA requires the lead agency (a lead agency is usually the governmental agency with the first general approval responsibility over a project) to take adverse environmental impacts into account and to mitigate or avoid significant adverse effects on the environment. Under CEQA, mitigation must be feasible and the agency requiring the mitigation must find its legal authority to do so independent of CEQA. The McAtteer-Petris Act gives broad authority to the Commission to control the amount and the impacts of fill in the Bay. Therefore, when the Commission is a lead agency it not only can, but must, require feasible mitigation for significant adverse environmental impacts caused by Bay fill.

Further authority for the Commission to impose mitigation requirements comes from the public trust. As a public property interest that applies to most of the Bay, the public trust provides the Commission with broad regulatory authority over the development of lands subject to the trust.

Mitigation Policy

For almost 15 years the Commission has required that Bay fill projects offset the unavoidable adverse impacts of the fill pursuant to the authorities discussed above. A statement reflecting that policy was explicitly included

in the Commission's San Francisco Bay Plan in 1985. The Bay Plan (page 37) states:

Mitigation for the unavoidable adverse environmental impacts of any Bay fill should be considered by the Commission in determining whether the public benefits of a fill project clearly exceed the public detriment from the loss of water areas due to the fill and whenever mitigation is necessary for the Commission to comply with the provisions of the California Environmental Quality Act. Whenever mitigation is needed, the mitigation program should be provided as part of the project. Mitigation should consist of measures to compensate for the adverse impacts of the fill to the natural resources of the Bay, such as to water surface, volume or circulation, fish and wildlife habitat or marshes or mudflats. Mitigation is not a substitute for meeting the other requirements of the McAtteer-Petris Act concerning fill. When mitigation is necessary to offset the unavoidable adverse impacts of approvable fill, the mitigation program should assure:

- (1) That benefits from the mitigation would be commensurate with the adverse impacts on the resources of the Bay and consist of providing area and enhancement resulting in characteristics and values similar to the characteristics and values adversely affected;
- (2) That the mitigation would be at the fill project site, or if the Commission determines that on-site mitigation is not feasible, as close as possible;
- (3) That the mitigation measures would be carefully planned, reviewed, and approved by or on behalf of the Commission, and subject to reasonable controls to ensure success, permanence, and long-term maintenance;
- (4) That the mitigation would, to the extent possible, be provided concurrently with those parts of the project causing adverse impacts; and
- (5) That the mitigation measures are coordinated with all affected local, state, and federal agencies having jurisdiction or mitigation expertise to ensure, to the maximum practicable extent, a single mitigation program that satisfies the policies of all the affected agencies.

If more than one mitigation program is proposed that satisfies all five factors above, the Commission should consider the cost of the alternatives in determining the appropriate program.

To encourage cost effective and comprehensive mitigation programs, the Commission should extend credit for certain fill removal and encourage land banking provided that any credit or land bank is recognized pursuant to written agreement executed by the Commission. In considering credit or land bank agreements, the Commission should assure that the five factors listed above will be met.

Scope of Review and Report Organization

To assess how the Commission has applied its mitigation policies, all major permits, material amendments, and federal consistency determinations from February, 1974, when the Commission first used the present mitigation process, through December, 1986 were reviewed. Excluded from the study were administrative permits and non-material amendments which, by definition, consist of "minor repairs and improvements."

Fill projects have been grouped into four categories: (1) floating fill (such as boat docks and permanently moored vessels); (2) submerged fill (such as waste water and flood water outfall pipes, riprap, boat ramps, and beaches); (3) pile-supported fill (such as piers, bridges, boardwalks, and portions of buildings supported on piles); and (4) solid or earth fill (such as container terminals, levees, and fill for improving shoreline appearance). Each of these fill categories is discussed in subsequent separate chapters. The major environmental impacts of each category of fill are discussed, followed by several representative examples of fill projects within each category. Projects that were designed carefully by the applicant so that the Commission did not have to require any additional mitigation are also included. The examples have been chosen to reflect the range of mitigation

that has been required, as well as to reflect historical pattern in the Commission's mitigation requirements. The final chapter, Chapter V, is the recommended mitigation guidebook that would be published as a separate document for general distribution. The guidebook would resemble the Commission's "Public Access Design Guidelines" document that is provided to permit applicants and other parties interested in public access. The Mitigation Guidebook chapter includes mitigation guidelines on each of the four general fill categories and identifies sources for possible mitigation sites and lists organizations and agencies that can assist applicants with mitigation sites.

It is important to realize that this guidebook is not a compilation of all fill projects approved by the Commission. Nor does it list all permits where mitigation has been provided. Rather, the guidebook seeks to illustrate how the Commission has applied its mitigation policy through representative examples.

Finally, it should be emphasized that the purpose of mitigation is to offset the specific adverse environmental impacts of a particular project. The Commission's mitigation policy has evolved from practical experience based on current understanding of how various kinds of fill impact the Bay and how best to offset such impacts through mitigation measures. As our understanding of these processes grows, it is likely that the Commission's mitigation policy will change. Similarly, although some types of fills may have insignificant environmental impacts at most locations around the Bay, the same fill proposed at another location (for example, in a habitat supporting endangered species or along a migratory corridor) may have significant environmental impacts requiring mitigation.

CHAPTER I. FLOATING FILL

Floating fill is designed to float at all or most tidal stages. Most floating fill authorized by the Commission has been for marina docks, historic ships, drydocks, floating breakwaters, barges moored for extended periods of time, and pedestrian walkways.

Environmental Impacts

Generally, floating fills can impact the Bay by: 1) blocking sunlight, thereby eliminating marsh plants and reducing photosynthesis in planktonic and benthic (bottom dwelling) organisms; 2) reducing wave energy, thereby increasing the rate of siltation and affecting tidal circulation and currents; and 3) reducing oxygen exchange by reducing the amount of Bay surface area available for such exchange. In addition, large floating fills, such as drydocks, may displace large volumes of water thereby reducing the tidal prism. Floating fills that rest on the Bay bottom for some tidal stages (such as some houseboats and docks in marinas subject to heavy siltation) may smother or crush benthic organisms lying below.

Boat Docks

Since 1974, the Commission has approved 49 major permits or material amendments involving construction of recreational boat docks. Authorized boat docks or floats have ranged in size from a 384 square foot boat dock at a single-family residence (Kokalis, BCDC Permit No. 12-82) to docks for a 536-berth marina covering 164,090 square feet (3.76 acres) of Bay surface at a mixed use development (Price, BCDC Permit No. 18-85).

Recreational boat docks, whether proposed in large numbers at a marina or individually in conjunction with a single-family residence, are generally narrow (eight feet wide or less) and displace relatively little water volume. Thus, their impact on water volume and circulation is relatively insignificant. Large numbers of boat docks can reduce gaseous exchange and the amount of light that penetrates to the bottom of the Bay, but these impacts have not been well studied and have generally been assumed to be insignificant. As a result, the Commission has rarely required mitigation for boat berths.

As the Bay and its shoreline become more fully developed, however, an increasing number of marinas have been proposed in areas with deteriorated wharves, sunken barges, dilapidated pilings and dolphins, and other debris. In addition, several applicants have sought to modernize or reconfigure existing marinas. In such cases, deteriorated structures in the Bay have been removed prior to installing the new berths. Also, some marinas have expanded the Bay through the excavation of uplands to create a marina basin. The Commission has found that such actions offset any adverse impacts of the marina's fill for boat docks. In fact, since 1980, of 22 Commission permits involving boat docks, 18 involved the removal of some fill prior to construction. In the majority of such permits, the Commission found that the removal of deteriorated structures from the Bay and the expansion of the Bay through excavation of upland areas were public benefits that helped offset any adverse impact of the project's fill. Examples of such permits include the Ballena Isle Marina project in Alameda (BCDC Permit No. 12-84) and the Vallejo Municipal Marina project in Vallejo (BCDC Permit No. 1-86).

The Ballena Isle Marina project consisted of the construction of 15 new boat berths covering 4,186 square feet (.09 acres), relocation of 14 existing berths, the replacement of an existing fuel dock, and the repair of existing boat berths. The permit does not contain any condition requiring mitigation for the fill, but includes a finding that "the reconstruction of the fuel dock and other boat berths will result in a decrease of Bay coverage of 1,700 square feet....The floating fill is clearly a water-oriented use...and together with the increase of Bay area, the Commission finds the proposed project consistent with Bay Plan policies...."

The Vallejo project involved excavating 2.3 acres of upland and dredging an 18.8-acre water area to create a marina basin; constructing a 1,600-foot-long sheetpile breakwater; and constructing 350 boat docks covering a total of 110,000 square feet (2.53 acres) of Bay surface area. Although the permit contains no conditions requiring mitigation for the fill, the Commission did find that "2.3 acres of new Bay surface area will be created as mitigation for the project. Therefore, any environmental impacts from the fill or dredging will be offset by the substantial public benefits of the project and no further mitigation is required...."

Based on review of the Commission's permits, the Commission has not generally required mitigation for floating boat docks. However, there have been some specific instances where applicants provided mitigation because either constructing the boat dock(s) or boat use in the area would have localized and particular impacts on Bay resources. These projects included construction of a single boat dock at the Kokalis residence at Strawberry Point in Marin County and construction of a marina at Encinal Terminals in Alameda.

The Kokalis project (BCDC Permit No. 12-82) involved installation of a boat dock and appurtenant structures covering 384 square feet of Bay surface area. However, the only route from the boat dock to deep water was along a dredged channel that ran immediately adjacent to a harbor seal haul-out grounds, a unique and sensitive wildlife resource. The Commission found that "although it is unlikely that the addition of just one more boat dock would increase boat traffic past the haul-out grounds, the approval of one boat dock means that the Commission will have no basis for denying any similar boat docks in the area. The cumulative impact of all these boat docks would pose a severe disturbance to the harbor seals...." For this reason, the Commission conditioned their approval as follows: (1) the permit was limited to two years, providing the Commission with the opportunity to re-evaluate the impact of this project in light of events that might occur and new information that became available; and (2) use of the boat dock was restricted to the six months of the year that harbor seals did not use the haul-out grounds.

The marina project at Encinal Terminals (BCDC Permit No. 5-83) consisted of renovating and enlarging an existing marine terminal from one container berth to three container berths, and expanding an existing marina by 228 berths. The floating fill for the marina was relatively small in proportion to the overall fill proposed for the project (approximately 16 per cent or 38,600 square feet of a total fill of 240,300 square feet [5.5 acres]). Nonetheless, the applicant included the floating fill for the marina along with the solid and pile-supported fill for the marine terminal in its calculations of how much mitigation would be needed for the project. Mitigation in this case consisted of a contribution to a Commission-approved mitigation bank program equal to the cost of acquiring, restoring, and

maintaining an area equal to the net fill on the site. In their permit for the project, the Commission found that "the proposed mitigation is sufficient to offset the detriments caused by the Bay fill proposed in this project. Therefore, the Commission finds that the public benefits of the project exceed the detriments caused by the fill. The Commission notes that the mitigation funds were proposed by the applicant and should not be contrived as establishing a precedent for projects approved under the Seaport Plan...."

Vessels Moored for Extended Periods

Under the Commission's law, floating structures moored for extended periods are fill. Since 1974, the Commission has approved nine permits involving the long-term mooring of floating structures. Five of these permits authorized the permanent mooring of historic ships (the same vessel was involved in two of these permits), two involved houseboats, and two involved the same group of barges.

Because of their size, floating structures moored continuously for long periods generally block more sunlight and displace more water volume in a given area than boat docks. In some cases, floating structures that rest on the Bay bottom at some tidal stages have also raised concerns that the structures can impact the benthic community in the Bay muds by resting on the Bay bottom at low tide, or by increasing the rate of sedimentation around the structure by "stilling" wave action. Although the Commission has expressed concern regarding such impacts, none of these projects have provided or have been required to provide mitigation. The Commission has, however, limited the term of some of these permits so that the environmental impacts of the fill can be monitored. Examples of such permits include mooring of an historic

ship on the San Francisco northern waterfront and the mooring of 150 LASH (lighter aboard ship) barges at Redwood City.

In the permit to Delta King Enterprises and the Port of San Francisco (BCDC Permit No. 6-80) the Commission authorized the permanent mooring and remodeling of the 17,000 square foot Delta King, an historic paddlewheel steamer, for public access, offices, three restaurants, and retail shops. No mitigation was provided. The Commission found that "the public interest in preservation outweighs any public interest in additional restriction of uses....Because the proposed vessel will float at all stages of the tide, it will have minimum effect on the volume, surface area, and circulation of the water in the Bay...."

The permit to the Port of Redwood City (BCDC Permit No. 7-82) involved the mooring of 150 LASH barges covering 270,000 square feet (6.2 acres) in Redwood Creek. The primary issue the Commission considered was whether the barges, which would rest on Bay mud at low tide, would significantly impact benthic organisms and feeding areas for marsh birds, shore birds, and migratory waterfowl. The Commission found that the project would not significantly adversely affect the environment so long as the barges were removed at the end of a two-year period. This project was not pursued and two years later, the applicant was authorized to moor 89 of the barges at a different location where all the barges would float at all stages of the tide. The Commission limited this authorization to two years as well, and concurred with the Port's findings that the project would not have a significant impact on the environment (BCDC Permit No. 15-84).

Drydocks

Since 1974, the Commission has authorized two floating drydocks, the largest form of floating fill that have been authorized by the Commission. Because of their size, drydocks are the most likely of the floating fills to have adverse environmental impacts and, in fact, both permits provided mitigation, albeit less than would have been provided had the fill involved solid or permanently placed fill (both permits authorized the fill for a limited period). The permit to Continental Maritime provides the best example of mitigation required by the Commission for floating drydocks.

The permit to Continental Maritime and the Port of San Francisco (BCDC Permit No. 19-84) involved the mooring of a 112,000 square foot (2.57 acre) floating drydock for ship repair. The applicant proposed to remove 5,670 square feet of pile-supported fill from a 38,500-square foot water area to mitigate for the adverse environmental impacts, a proposal the Commission later adopted as a mitigation condition. In addition, the Commission limited the permit to four years duration and restricted work on installing the dry dock to those times of year that would not adversely affect spawning herring. The Commission found that "although the 5,670 square feet of mitigation is considerably less than the 113,100 square feet of fill placed, the Commission finds that it is justified because this authorization terminates on February 28, 1989 and the effects will not, therefore, be long-term. The Commission notes that if the proposed project remains for a longer period of time, that additional public benefits would likely have to be provided to offset the loss of Bay surface area....The future public benefit could involve a total amount of area of new Bay surface [equal to] the area covered by the floating fill...."

CHAPTER II. SUBMERGED FILL

Submerged fills are those fills that are predominantly underwater. Examples of submerged fills include storm water outfall pipes, pipelines, riprap, breakwaters, public access facilities such as tidal stairs, and boat launching ramps.

Environmental Impacts

The environmental impacts of submerged fill include: (1) changes in the Bay substrate which can significantly affect the kinds and numbers of benthic and intertidal organisms that live in an area; (2) alteration of currents and water circulation patterns which can affect the rate of sedimentation (e.g. breakwaters); (3) resuspension of sediments and pollutants suspended in Bay muds if dredging is involved (e.g., for pipelines and outfalls); and (4) alteration of the natural process of shoreline erosion and accretion that typifies most of the Bay edge (e.g., riprap, bulkheads, and breakwaters).

Riprap

Most projects within the Commission's jurisdiction seek to create a permanent shoreline as part of the project to protect the shoreline from tidal erosion. As riprap is by far the most common means of shoreline protection in San Francisco Bay, the Commission has approved many miles of riprap. Though riprap represents a dramatic change in substrate affecting an area's animal and plant life, most environmental documents contain little or no discussion of the environmental impacts of riprap; by implication, such impacts are

usually considered to be insignificant. Thus, the Commission has not required mitigation for riprap. A typical example of Commission action on a permit involving riprap would be the permit issued to Robert Greene (BCDC Permit No. 28-78). This project involved constructing an office and commercial services complex near Point San Quentin in San Rafael. The only fill proposed consisted of placing 5,300 cubic yards of riprap along 1,144 feet of a levee that protected the property from tidal inundation. The Commission determined there were no adverse impacts resulting from the riprap and, consequently, no mitigation was provided.

Though the Commission has not required mitigation for riprap, the Commission typically conditions such permits to assure that fill placed for riprap creates a permanent, well-engineered, stable and safe shoreline requiring little future maintenance. The Commission has also required applicants to design riprap projects to minimize fill and has encouraged designs that both protect the shoreline from erosion and provide habitat for wildlife. A permit to the City of San Mateo (BCDC Permit No. 9-75) is an example.

This project involved reconstructing an existing levee by grading the bayward face of an existing dike to create a flatter slope prior to placing riprap. The net effect of both the excavation and the filling was to increase the water surface area along the reconfigured dike by approximately 25,000 square feet (.57 acres), as well as providing a gradual slope where Bay-related wildlife could find sites for resting and feeding.

Storm Drains, Pipelines, and Outfall Pipes

Storm drains, pipelines, and outfall pipes, like riprap, are generally processed administratively unless they are part of a larger project requiring

Commission action. Usually buried, the excavations and subsequent fills associated with these projects have been found by the Commission to pose few significant permanent environmental impacts and consequently the Commission has not required mitigation for these kinds of projects. However, construction of such facilities may result in several significant short-term impacts. For example, the dredging involved in installing sewage outfall pipes can resuspend sediments and/or pollutants, and the heavy equipment needed to excavate a trench for pipelines and outfalls can disrupt existing marsh vegetation and mudflats when a pipeline is routed through these areas. The Commission has conditioned permits for such uses so that such short-term construction impacts are mitigated. An example of such a permit is one issued to the Shell Oil Company for work in the Suisun Marsh in Solano County (BCDC Permit No. 5-76). This permit involved constructing an underground natural gas pipeline through the Suisun Marsh. The Commission's permit incorporated most of the mitigation measures required in Solano County's local permit. These mitigation measures included using wide track or amphibious construction equipment and mats to prevent construction equipment from sinking into the soft marsh muds; restricting construction to a narrow corridor to avoid disturbing adjoining marsh areas; working from existing roads wherever feasible to avoid compacting marsh soils; assuring that the top two feet of native soil excavated from the pipeline trench was replaced as the top layer when the trench was backfilled; and reseeding or replanting disturbed areas that had not naturally revegetated within one year of project completion.

There is one instance where an applicant restored and dedicated a 4,400-square foot marsh in addition to adopting construction measures designed to mitigate possible short-term construction impacts. In its permit to the

Public Access

The Commission has also authorized submerged fill for such public access purposes as tidal steps, beaches, and boat launch ramps. Such fills can alter the substrate of the intertidal area, thereby affecting what plants and animals can reside in the area. With the exception of two beach replenishment projects, most of the public access fills approved by the Commission have been small (less than 3,500 square feet) and the Commission has found that their impacts are insignificant compared with the benefits of improving public access to the Bay. For example, in a permit issued to the City of Alameda (BCDC Permit No. 22-79), the Commission authorized construction of a 2,320-square-foot boat launching ramp and associated parking, and the improvement of an existing rubble breakwater for fishing access. The Commission found that "because the proposed fill is small and will be placed...on the bottom of the Bay...the fill will have minimum effect on the volume, surface area, and circulation of the waters of the Bay...."

The Commission has also approved two permits that involved placing fill over much larger areas to create or restore a beach. The Commission allowed the East Bay Regional Park District and the City of Alameda (BCDC Permit No. 9-81), to place up to 200,000 cubic yards of sand over a 15-acre existing beach to replenish sand lost through erosion. The project was necessary both for shoreline protection (the beach, which was eroding, protected a major shoreline road and several apartment buildings and homes) and to maintain a popular recreational beach. The permit included a number of conditions, most of which reinforced statements made in the application, to assure that a monitoring and maintenance program would be instituted to prevent sand from

migrating into ecologically sensitive neighboring areas. The permit also prohibited depositing sand at an interim site offshore prior to pumping sand onto the beach unless several conditions are met.

CHAPTER III. PILE-SUPPORTED FILL

Pile-supported fills are supported above water on pilings. Under the Commission's law, both the pilings and the structure supported over water by pilings are fill. The Commission has approved pile-supported fill for marine terminals, boat docks, bridges, public access boardwalks, restaurants, and houses.

Environmental Impacts

The adverse environmental impacts of pile-supported fill are similar to those of floating fill, that is: (1) driving pilings disrupts and displaces existing benthic communities; (2) pile-supported fill creates shade, which affects water and soil temperature and influences an area's plant and animal communities; (3) the pilings dampen wave energy and create eddies which alter water circulation and potentially increase the rate of sedimentation; and (4) pile-supported fill may disrupt animal use of an area and animal movement between areas. In addition, depending on their design and size, large pile-supported fills may reduce gaseous exchange between Bay waters and the atmosphere.

Public Access

Since 1974, the Commission has approved 31 major permits and material amendments involving the construction of pile-supported public access facilities such as boardwalks, fishing piers, and observation decks. The majority of such facilities have been less than 2,500 square feet and have

been relatively narrow requiring few support piles, thus causing minimal shading and shoaling. Most of these fills have also been designed to be compatible with sensitive wildlife resources. For these reasons, the Commission has generally found that the public benefits of improved access to the Bay offset the insignificant environmental impacts of such fills. A typical example is the Burlingame Group (BCDC Permit No. 18-83) to construct a 300-room hotel and two restaurants in the shoreline band in Burlingame. The only fill proposed in this project involved a small amount of riprap and an approximately 1,500-square-foot pile-supported public access deck. Neither the Negative Declaration, the application summary, nor the permit identified any adverse impacts of the fill and therefore the Commission did not require mitigation.

Although most permits for pile-supported public access facilities have involved relatively small amounts of fill, the Commission has authorized six permits where more than 7,000 square feet of pile-supported fill would be placed for public access. The largest of these fills was 66,668 square-feet (1.56 acres) authorized to the Port of San Francisco to construct a promenade between the Agriculture Building and Pier 24 (BCDC Permit No. 3-78). Each of these six permits also involved removal of substantial amounts of existing Bay fill so that each project resulted in a net increase in Bay surface area. It is not clear from the records of these permits whether such fill removal was necessary for the Commission to authorize the pile-supported public access fill. It is clear that the Commission considered such fill removal to be a significant public benefit. For example, in its permit to the Port of San Francisco (BCDC Permit No. 8-84) the Commission authorized the Port to remove the existing 88,270 square-foot (2.02 acre) Pier 7 and replace it with a

33,600-square-foot (.77 acre) public access pier. Neither the Negative Declaration nor the application summary identified any adverse impacts of the proposed fill. The permit does contain a finding that the project "will result in an increase of 54,600 square feet of Bay surface area..." and thus implies that any adverse impact of the fill would be offset by removing the larger existing pier.

Marinas and Boat Docks

Marinas use pile-supported fill to provide access to berthing areas, for boat hoists, for observation decks, and for covered boat berths. Pile-supported fill is also used to provide docking facilities for fishing boats and ferries. Like pile-supported fill for public access, these fills tend to be small (only one of the 12 Commission permits issued for such fills involved more than 9,000 square feet of Bay coverage) with minor environmental impacts. Consequently, such fills have generally not provided mitigation. Two examples of pile-supported fills authorized for marinas or docking facilities include the Schoonmaker Point project in Sausalito (BCDC Permit No. 21-79) and the Napa Valley Marina Expansion project on the Napa River (BCDC Permit No. 20-78). The Schoonmaker Point project involved remodeling an existing building in the shoreline band for use as a fish processing plant and constructing a 8,670 square foot pile-supported pier for mooring and maintaining fishing vessels. The permit included a finding that "because the proposed fill is small and largely pile-supported, it will have a minimum effect on the volume, surface area, and circulation of the water of the Bay." Therefore, mitigation was not provided.

The Napa Valley Marina Expansion project involved enlarging an existing 91-berth marina by adding 48 covered boat berths covering 27,000 square feet (.62 acres) of Bay surface area. Mitigation was not provided and the Commission found that "the pile-supported...fill is of a size and type such that harmful effects on the Napa River will be minimized...."

Although the majority of permits for pile-supported marina facilities and boat docks have not provided mitigation, many have involved the removal of some existing fill. For example, in a permit to Harbor Carriers, Inc. and the Port of San Francisco (BCDC Permit No. 42-79) involving remodeling Pier 43-1/2 for its continued use as a ferry and tour boat terminal, the applicants' proposed to remove a 5,524 square foot deteriorated pier to make room for two new piers totaling 7,349 square feet. The Commission subsequently required the pier removal as a permit condition.

Buildings

Since 1974, when the Commission first required mitigation, the Commission has authorized eleven permits for pile-supported buildings. Four of these permits involved fills of 750 square feet or less and were authorized originally in the first two and one-half years that the Commission began using mitigation in the public benefits equation.^{1/} None of these small fill projects provided mitigation, although it is not clear whether this was due to the Commission determining that these fills would have relatively insignificant impacts on the Bay or to the fact that the Commission was just beginning to apply a new, unfamiliar policy.

^{1/} Two of these permits involved the same project, originally authorized in 1975 and subsequently reauthorized in 1979.

Of the remaining seven permits for pile-supported buildings, five clearly involved mitigation, one involved the removal of a substantial amount of existing Bay fill, and one was proposed in an area where there were several existing deteriorated pilings. As the two seemingly anomalous permits were both approved in the first six months that the Commission began applying its mitigation policy, it seems that projects involving pile-supported buildings covering 1,000 square feet or more of Bay should expect to provide mitigation for the fill's impact on Bay resources. For example, the Commission authorized the Port of Oakland (BCDC Permit No. 24-81) to remove an existing, vacant restaurant and associated wharves and floats covering 12,700 square feet of Bay surface and to construct a new restaurant and associated decks covering 4,000 square feet of Bay. The permit included a finding stating that "removal of the deteriorated structure and the consequent opening of the majority of the previously filled area to free tidal action constitutes a public benefit that clearly outweighs the detriments caused by the fill...."

In another case, the Commission permitted the Sausalito-Marin City Sanitary District (BCDC Permit No. 24-80) to construct a 16,078 square foot (.37 acre) addition to an existing sewage treatment plant. Both the existing plant and the addition were located almost entirely in the Bay. Although the applicant contended that the project provided its own mitigation by improving Bay water quality, the Commission required the permittee to return an area equivalent in size to the area filled to tidal action. The permit included a finding that "while the Commission has required larger amounts of mitigation in the past, the Commission finds that this amount of area to be opened to tidal action is sufficient to offset the impact of this type of project at this location...."

Bridges

The Commission has approved twelve pile-supported automobile or railroad bridges ranging in size from 510 square feet to 604,352 square feet (14.2 acres). In addition to creating shade and increasing shoaling, bridges can present a significant barrier to wildlife. Often, bridges isolate a small area of tidelands that have no other direct connection to the Bay. The physical barrier of the bridge, the resulting traffic and noise, and the increase in human activity all impede animal use of an area that may otherwise appear unchanged. Because of these adverse environmental impacts, all but one of the permits for pile-supported bridges have provided mitigation. In fact, the first time the Commission required mitigation was in a permit to the California Department of Transportation (Caltrans) in February 1974 for constructing the Dumbarton Bridge and its approaches (BCDC Permit No. 20-73). Two typical examples of bridge permits are a permit to Caltrans to construct a bridge in Richmond (BCDC Permit No. 17-85) and a permit to the City of San Mateo to construct a bridge across Seal Slough (BCDC Permit No. 18-87).

The Richmond project involved constructing a 2,856 square foot pile-supported bridge across Stege Drain. The Commission's permit required that the permittee offset the adverse impacts of the fill by either "(1) restoring or enhancing approximately 2,856 square feet of tidal marsh [proposed originally by the applicant], or (2) contributing a sum of money...to go toward the purchase and restoration of approximately 2,856 square feet of tidal marsh...at an East Bay location within a reasonable amount of time...."

The City of San Mateo's project consisted of placing 1.5 acres of pile-supported Bay fill to construct a new four-lane bridge across Seal

Slough. The project also involved placing approximately 2.77 acres of solid fill in non-tidal wetlands largely outside the Commission's jurisdiction. Early in the planning process, the permittee worked with the U. S. Fish and Wildlife Service, the State Department of Fish and Game, and Bay Commission staff members to develop an acceptable compensation proposal for the fill (including the fill outside the Commission's jurisdiction). That proposal consisted of excavating a system of channels and ponds in eight acres of a 43-acre City-owned marsh. Nearly all of the 43-acre area was already subject to tidal action, but the eight acre enhancement area was relatively high, and therefore inundated infrequently and relatively devoid of vegetation. The Commission's permit incorporated this proposal as a permit condition, but also required excavating a system of small mosquito abatement channels throughout the remaining 35 acres of marsh to improve tidal circulation throughout the marsh. The additional work was estimated to take a mosquito abatement trencher approximately one or two days to complete at a cost of less than \$1,000.00.

The one pile-supported bridge that did not involve mitigation was a 9,450-square-foot bridge proposed by the City of San Leandro (BCDC Permit No. 4-76) across a flood control channel. The purpose of the bridge was to provide access to a 156 acre public shoreline recreation area. The permit contained a plan review condition requiring "examination of the number of pilings necessary to support the bridge to minimize impacts on Bay waters below, to minimize restriction of flood waters from upstream, and to maximize visual access to the Bay...." The permit also contained a finding that the project benefited the public by allowing "public access to 156 acres of Bay shoreline which will be developed for public recreation use." Although it is

not stated clearly in the permit, the Commission apparently found that the public benefit of improved access to a large public shoreline recreation area was sufficient to offset the adverse impacts of the fill.

Marine Terminals, Wharves, and Water-Related Industry

Pile-supported fills for marine terminals and wharves used for water-related industry tend to be larger than other pile-supported fills approved by the Commission. For this reason, their effects on shading, water circulation, and shoaling tend to be more pronounced. The largest of these fills can dramatically alter an area's appearance and its availability to wildlife, and significantly increase noise levels and human activity in the area.^{2/} Because of these adverse impacts, 19 of the Commission's 22 major permits, material amendments, or consistency determinations for pile-supported marine terminals or water-related industrial wharves have offset the fill's adverse impacts either through removal of existing pile-supported fill performed in the course of project construction, or through mitigation. In all but seven of these 22 projects, the Bay's surface area remained the same or actually increased as a result of project construction. The following four examples illustrate the variety of ways applicants have offset the adverse impacts of these fills.

In a permit to the Richmond Redevelopment Agency (BCDC Permit No. 27-80), the Commission authorized the temporary use of a former construction site to construct production facilities for the Alaskan North Slope oil

^{2/} The severity of these impacts are reduced somewhat by the fact that most of these fills have been proposed in industrial areas where wildlife resources have already been disturbed. Many of these fills replace or modernize existing similar facilities.

fields. Work in the Bay included placing a sand pad on the Bay bottom to support barges as they were being loaded, new dolphins, and a 960 square foot pile-supported wharf for a total fill of approximately 1,300 square feet (.03 acre). The applicant proposed to offset the impacts of these various fills by doing extensive shoreline cleanup of this former construction site, removing such objects as concrete pilings and slabs, wood scraps and timbers, and wire cable and steel drums, a proposal the Commission subsequently required in a permit condition. In addition, the Commission required that "all improvements placed pursuant to this permit, including the 14 dolphins, the 1,000-square-foot off-loading wharf...and enough of the sand pad to bring its elevation to 10 feet below Mean Lower Low Water shall be removed by December 1, 1984 [the estimated project completion date]...." The Commission found that "by extensively cleaning up the shoreline, safe public access will be provided to a shoreline that has long been closed to the public, and a major step will have been taken toward fulfilling the Special Area Plan goal of creating attractive public access along this entire shoreline..." and that the project's public benefits outweighed the project's possible adverse impacts.

In a permit to the Port of Redwood City (BCDC Permit No. 3-84), the Commission authorized replacing an existing 36,100 square foot (.83 acre) deteriorated timber wharf with a new 24,700 square foot (.57 acre) concrete wharf. The Commission approved the project as proposed, apparently finding that the net 11,400 square foot (.26 acre) increase in Bay surface area resulting from project construction adequately offset any of the fill's adverse environmental impacts.

In BCDC Permit No. 8-79, the Commission authorized the Shell Oil Company to modernize an existing oil refinery in Martinez so that domestic oil could

be processed at the refinery. Work in the Bay consisted of placing 22,000 square feet (.51 acre) of pile-supported fill adjacent to the existing wharf to install pipelines on trestles and expand the wharf deck for emergency vehicles. Approximately 3.3 acres of marsh, mudflats, and submerged lands would be dredged to facilitate construction of the wharf improvements. The applicant proposed, and the Commission subsequently required in the permit, offsetting these project impacts by improving tidal action on 2.56 acres of land owned by Shell immediately adjacent to the wharf. Improvements to the wetlands consisted of widening an existing levee break that allowed limited tidal action into the 2.56 acre area and excavating approximately 5,000 cubic yards of earth to create a system of channels and ponds to improve water circulation throughout the marsh.

Finally, in a permit to the Port of Richmond (BCDC Permit No. 22-79), the Commission authorized construction of a 106,100-square-foot (2.44 acre) pile-supported marginal wharf for a marine terminal facility. Approximately 32,100 square feet (.75 acres) of solid fill would be removed in the course of constructing the project. The permit required that the applicant provide mitigation for the net fill of 74,000 square feet (1.7 acres) by preparing a plan that involved either "the removal of derelict or unneeded pile-supported structures, the removal of earth fill, the removal of debris from marsh or shoreline areas, the contribution of funds toward the acquisition or improvement of a large restoration project or a combination thereof...."

Four of the 22 projects for pile-supported terminals involved substantial fill removal, but resulted in a net decrease in Bay surface area because more fill would be placed than would be removed. In three of these permits, extensive findings explained why additional mitigation was not

provided. For example, in a permit to the United States Coast Guard (BCDC Consistency Determination No. CN 7-85), the Commission concurred with the construction of a new 60,700-square-foot (1.39 acres) pile-supported wharf to moor four Coast Guard cutters. To provide space for the new wharf, the Coast Guard would remove an existing deteriorated timber wharf covering 22,500 square feet (.52 acre). The Commission's findings state, in part, that:

"the particular manner in which the pier will be constructed should result in minimal impact on the biota underneath the wharf. The proposed 40-foot width of the Coast Guard's facility should cause less shading than most wharves built parallel to the shoreline because the wharf will not be immediately adjacent to the shore....The 75-foot separation between the shoreline and the wharf will allow sunlight to penetrate to the bottom of the Oakland Estuary from the landward side of the wharf, exposing the bottom to the sun during longer periods of the day....Furthermore, the Commission's consultant states the pier will have a minimal impact because the new pier will be located fairly high above the surface of the water. Species that presently use the area, such as fish-eating birds, may still be able to use the area....

"The primary public detriment of the fill associated with the Coast Guard's project appears to be the loss of...Bay surface. However, the project will also provide unique public benefits. The new mooring facilities will enhance the Coast Guard's effectiveness in carrying out public service missions that benefit the entire San Francisco Bay Area and Bay resources in particular. One such public service mission is marine environmental protection. The Coast Guard plays an integral role in policing oil tankers and other cargo vessels to ensure that the operators of these vessels adhere to federal laws against discharging oily wastes and other pollutants into the Bay and coastal waters. In addition, the Coast Guard aids in the cleanup of oil spills in Bay waters....

"Another important public service mission performed by the Coast Guard in the Bay is search and rescue. The maritime community relies on the Coast Guard to respond to them in boating emergencies. Furthermore, the Coast

Guard provides law enforcement on Bay waters. All of these services are directly beneficial to water-oriented uses such as shipping, fishing, recreational boating, and to the environmental protection of the marine environment....The Commission finds that these public benefits of the project outweigh the public deterrents from the fill associated with the project. Therefore, the Commission finds that mitigation is not necessary in this case because detrimental effects of the project are sufficiently offset...."

Although most of the 22 projects for pile-supported terminals resulted in no net fill or a net increase in Bay surface area, the Commission has authorized three permits for terminals that involved little or no fill removal. These permits involved fills ranging in size from 5,220 square feet (.12 acre) to 11,680 square feet (.25 acre). A review of these permits sheds little light on why the Commission did not require mitigation in these instances. Apparently the Commission determined that the relatively small size of these fills would result in insignificant adverse impacts to the Bay.

CHAPTER IV. EARTH FILL

Earth fills are solid fills placed in tidal areas to create dry land. The Commission has approved earth fill for marine terminals, water-related industry, marinas, exploratory natural gas wells, levees, roadways, and public access.

Environmental Impacts

Of the various kinds of fill, earth fills have the most dramatic impact on the Bay. Earth fill transforms an existing tidal area to upland. Such fills can potentially have serious impacts on the Bay, including: (1) destruction of fish and wildlife habitat and disruption of the ecological balance of the Bay; (2) reduction in the Bay's surface area and volume thus decreasing the Bay's aquatic habitat, reducing the amount of water available to assimilate wastes, and reducing the tidal prism that flushes wastes from the Bay; and (3) reduction in the climate-moderating effects of the Bay thereby increasing the possibility increased air pollution. Even small fills can have far-reaching and sometimes highly destructive effects. For these reasons, since 1974 the Commission has required that nearly all earth fills it approves offset the impacts of such fills through mitigation or through project design that negates the adverse impacts of the fill on Bay resources. In nearly all cases, implementation of the mitigation measures has assured that the project resulted in creating wildlife resource values equal to or greater than the values lost from the fill. The following examples illustrate many of the various mitigation measures that have been employed to offset the unavoidable adverse environmental impacts of earth fill.

Shoreline Improvement and Public Access

Most earth fills authorized as improving shoreline appearance and public access have been relatively small, involving less than 6,000 square feet of fill (.14 acre). Nearly all projects involving such fills have provided mitigation for the fill's impacts. For example, in a permit to Ponderosa Homes in Alameda (BCDC Permit No. 1-80) the Commission authorized construction of 30 single-family residences and placing approximately 6,000 square feet (.14 acre) of fill in a small, debris-strewn drainage ditch subject to tidal action primarily for public access uses. In conjunction with the Department of Fish and Game and the BCDC staff, the applicant developed a proposal to mitigate the fill's effects by creating a 14,000-square-foot (.32-acre) lagoon at a different location on the property. The lagoon was to be developed as an integral part of the project's public access. The Commission incorporated this proposal as a permit condition, finding that "the public benefits from constructing the lagoon outweigh any detriments from the fill in the channel...."

In another example, the Commission, in a permit to Alameda Marina Village Associates in Alameda (BCDC Permit No. 39-79) authorized construction of a marina, offices, commercial and residential buildings on 206 acres that had been formerly used as a shipyard. The existing shoreline was cluttered with deteriorating wood and concrete wharves, extensive sheetpiling, numerous piles, and four large concrete shipways. The applicant proposed creating an attractive and developable shoreline by removing much of the existing fill and placing earth, pile-supported, submerged, and floating fill at locations where removal costs were excessive. In all, the Commission authorized 36,500 square feet (.84 acre) of solid fill for largely public access uses out of a total approved fill of 335,084 square feet (7.69 acres). However, so much

fill was removed (342,022 square feet or 7.85 acres) that the project resulted in a net increase in the Bay's surface area. By designing the project so that project construction resulted in a net increase in Bay surface area and a marked improvement in shoreline appearance, the Commission was able to find that the project's benefits were sufficient to offset the fill's unavoidable adverse environmental impacts.

Mitigation has not been provided for all public access fills, however. The Commission has approved several minor public access fills of less than 1,000 square feet without mitigation, and in certain circumstances, the Commission has not required mitigation for larger public access fills. For example, in a permit to Caltrans (BCDC Permit No. 10-85) for a project in Sausalito, the Commission authorized placing 55,000 square feet (1.26 acres) of fill on a former railroad bed to construct a one-mile long public access path. The existing railroad bed was higher than much of the surrounding land, and the few plants that grew on it were characteristic of upland rather than tidal areas. However, through subsidence the railroad bed was occasionally inundated by tidal waters and was technically part of San Francisco Bay. The Commission found that the project would greatly improve public access in the area. The Commission also found that the project's impacts on fish and wildlife resources, and on water surface area, tidal circulation, and water volume were relatively insignificant. For these reasons, the Commission did not require mitigation for this project.

Roads and Bridges

Since 1974, the Commission has approved four projects involving earth fill for roadways and bridges. With the exception of one project involving

less than 450 square feet of fill, all have provided mitigation. For example, in a permit to the East Bay Regional Park District (BCDC Permit No. 30-79) for constructing Phase One of a 194-acre park on for a former landfill in San Leandro, the applicant proposed constructing a 1,900-square-foot (.04-acre) earth fill/culvert entrance roadway across a small tidal inlet to provide access to the park. The Commission authorized the project requiring the permittee to "create and permanently maintain a new salt water marsh covering not less than the area to be filled in the immediate vicinity of the marsh crossing...."

In another permit, the Commission authorized Caltrans (BCDC Permit No. 20-73) to replace the existing Dumbarton Bridge with a new pile-supported bridge covering 14 acres of Bay surface. In addition, 76 acres of earth fill would be placed in salt ponds and managed wetlands for bridge approaches.^{3/} In approving the project, the Commission required that the applicant develop a public benefits plan "to mitigate the unavoidable adverse environmental impacts of the project...." That plan, to be prepared in conjunction with BCDC, was to contain the following elements: (1) the cost of preparing and

^{3/} This permit was the first in which the Commission took a lead role in determining what kind and how much mitigation should be provided to offset a project's adverse impacts. This was not the first time the Commission had required mitigation, however. Mitigation first appeared in BCDC Permit No. 22-73 to the Golden Gate Bridge District to construct the Larkspur Ferry Terminal, a permit issued two weeks prior to the Commission's authorization of the Dumbarton Bridge. However, the mitigation required in that permit was largely worked out at Bridge District public hearings prior to the Bridge District making application to BCDC.

carrying out the plan would be \$900,000.00; (2) a new area or areas totaling not less than 200 acres would be acquired and returned to tidal action; the mitigation area(s) could not be subject to tidal action or used for salt production at the time the permit was issued, and preferably such area(s) would be located in the South Bay; and (3) any money not exhausted in acquiring and restoring the 200 acres should be "devoted to acquisition that will reduce or eliminate development pressures on wetlands and salt ponds which are in the Commission's jurisdiction and on which the project will have a material growth-inducing impact...."

Exploratory Gas Wells

Since 1974, the Commission has authorized five major permits for constructing drilling pads for natural gas exploration. All five have included essentially the same conditions and findings. A typical example is a permit the Commission issued to Dow Chemical Company (BCDC Permit No. 11-82(M)) for a project in the Suisun Marsh in Solano County. This project involved constructing a 24,700-square-foot (.57-acre) drilling pad in the primary management area of the Suisun Marsh. The permit required all fill material to be removed within a few months of completing drilling should the exploratory drilling prove unsuccessful. In addition, the permit required that "any marsh area disturbed during the construction of the drilling pad, drilling operations, or fill removal shall be reseeded with appropriate California native plant seed...within six (6) months of fill removal." Finally, the permit findings state that in the event the drilling proved successful "the Commission would require that an area, equal to or greater in size than the

area affected by such [permanent] facilities and not now subject to tidal action, be returned to tidal action and marsh as a condition of any authorization for such permanent facilities...."

Marinas

The Commission's marina policies (page 21 of the San Francisco Bay Plan) allow "fill for marina support facilities...at sites with difficult land configurations provided that the fill in the Bay is the minimum necessary and any unavoidable loss of Bay habitat, surface area, or volume is offset to the maximum extent feasible, preferably at or near the site." Earth fill has been authorized for several marinas, primarily to improve shoreline appearance and public access, or to provide additional parking areas. (NOTE: Such fill was approvable under the original Bay Plan. Bay Plan amendments adopted on December 2, 1982, generally eliminated fill for marina parking.) Nearly all such projects have offset the impacts of the fill with fill removal. The following three permits issued by the Commission are illustrative of the mitigation provided as part of these fill projects.

The Commission issued a permit to the Port of Oakland (BCDC Permit No. 8-77), for construction of Embarcadero Cove Marina, authorizing 11,500 square feet (.26-acre) of floating fill for 44 new boat berths and 4,500 square feet (.10-acre) of earth fill for public access. As part of the project, an existing deteriorated wharf and floating walkway covering 29,400 square feet (.67-acre) of Bay surface area would be demolished. The Commission concurred with the conclusions of the Environmental Impact Report that the fill removal and proposed public access improvements were sufficient public benefits to offset the adverse impacts of the fill.

In a permit to the Richmond Redevelopment Agency (BCDC Permit No. 11-78), the Commission authorized Phase One of the redevelopment of Richmond's Inner Harbor, a marina-centered development of commercial, recreational and public access facilities. In addition to floating fill for 500 boat berths and submerged fill for shoreline protection, the permit authorized .2 acres of pile-supported fill for marina-related commercial uses and 2.85 acres of earth fill to improve public access and shoreline appearance in a highly disturbed area formerly used for shipbuilding. To offset the adverse impacts of the fill, the applicant proposed creating and maintaining a 4.03-acre salt marsh by excavating adjacent, City-owned uplands. The applicant also proposed creating a .5 acre tidal cove to serve as the focal point for the shoreside development. The Commission determined that these mitigation measures adequately offset the resource values lost as a result of placing fill and included conditions requiring creation of the new tidal areas in the permit.

In another permit for a marina in Richmond, The New Red Rock Marina (BCDC Permit No. 19-83), the Commission authorized renovation and expansion of an existing 90-berth marina to accomodate 637 berths and new marina-related facilities. The existing marina had seriously deteriorated and was marked by numerous abandoned and sunken barges, docks, floats, oil spills, and miscellaneous debris. The proposed renovation included floating fill for boat berths, submerged fill for breakwaters, and 1.4 acres of earth fill, some of which was already in place but unauthorized, for public access and parking. As part of the project, the applicant proposed removing 2.5 acres of abandoned floats, barges, vessels, a ferry dock, breakwater, and all other debris in an effort to create a safe, attractive, and useable shoreline and marina basin. The Commission determined that "the significant adverse environmental effects

from the placement of solid fill for parking and public access will be mitigated to the extent feasible by the removal of existing fill and debris from the site...."

As stated earlier, nearly all marina projects that have involved earth fill have mitigated the adverse effects of the fill. The two projects that did not provide mitigation both involved relatively small fills of less than 850 square feet (.02-acre).

Levees

Since 1974 when the Commission first began requiring mitigation for fill projects, eight major permits involving fill for levees have been authorized. All but one have provided, or been required to provide, mitigation for the adverse impacts of the earth fill.

An example of a levee project which provided mitigation was the Sewerage Agency of Southern Marin project in Mill Valley (BCDC Permit No. 21-80). This project involved improving and expanding the Mill Valley Wastewater Treatment Plant, as well as constructing an effluent conveyance system along the shoreline. To build two stormwater retention basins, the applicant proposed constructing a dike that would either cover or remove from tidal action 6,400 square feet (.15 acre) of tidal salt marsh. The applicant proposed mitigating the loss of this wetland area by excavating 8,000 square feet (.18 acre) of uplands to create a new salt marsh, as well as enhancing an existing 12,000-square-foot (.28 acre) tidal marsh by removing debris and excavating channels to improve water circulation. In authorizing the project, the Commission included permit conditions requiring these mitigation measures and found that

"the public benefits from the marsh creation and marsh enhancement proposed by the permittee outweigh any detriments from the filling of the remnant, pocket marsh...."

Another levee project in which mitigation was provided was a project by the City of Albany (BCDC Permit No. 17-82). This project involved placing 6.3 acres of earth fill in the Bay to construct a perimeter dike and leachate barrier around a former landfill to seal the site, stabilize its slopes, and provide public access. The Commission required that the applicant mitigate the effects of the fill by improving water quality and water circulation in an existing 5-acre tidal lagoon adjacent to the landfill. In addition, the Commission required that the applicant "provide the equivalent of the restoration of 5.1 acres of land to tidal action, in a manner approved by or on behalf of the Commission, which may specifically include the contribution of funds to a mitigation land bank...."

In only one permit has the Commission authorized earth fill for levee construction without requiring mitigation for the fill, the permit issued to the Stauffer Chemical Company in Martinez (BCDC Permit No. 14-76). This permit permanently authorized a 10,890 square foot (.25 acre) dike that had previously been constructed as a temporary levee under BCDC Emergency Permit E-10 to prevent contaminated leachate from entering the Bay. The permit required the applicant to prepare a plan for eliminating and containing the leachate, and included a finding that "although the levee, a form of fill, is not consistent with the provisions of the San Francisco Bay Plan, it is so essential to the public health and safety as to justify approval because the leachate, if allowed to escape into the Bay, would contaminate significant amounts of Bay water, a problem that is of such a scale as to be of importance to the public in the entire Bay Area...."

Port and Water-Related Industry

Since February of 1974 when the Commission first began using mitigation as part of the public benefits equation, the Commission has approved nine major permits or material amendments authorizing earth fill for port or water-related industrial uses. All have offset the adverse impacts of the fill, usually by contributing to the acquisition and tidal restoration of an off-site parcel. In nearly all cases, the proposed contribution was equivalent to the purchase and restoration of a parcel of equal or greater size than the area proposed to be filled. Two typical examples of these fill projects and their associated mitigation are discussed below.

The first example is a permit issued to the Port of Oakland for Berth 5 (BCDC Permit No. 8-78). This project involved demolishing an existing 96,600-square-foot (2.22 acres) pile-supported wharf equipped with a portable container crane and replacing the facility with a new wharf and permanent crane on 68,250 (1.57-acre) square feet of pile-supported fill and 28,350 square feet (.65-acre) of earth fill (totalling 96,600 square feet). The Commission recognized that the project would result in no net Bay coverage and apparently determined that the removal of the existing pile-supported structures was sufficient to offset the new pile-supported fill. But the Commission also determined that the solid fill would have a permanent detrimental impact on water volume and wildlife habitat that was not sufficiently offset by the removal of an equal amount of pile-supported fill. For this reason, the Commission agreed with the applicant's proposal to use the remaining "credit" for leasing 18-acre Doolittle Pond to the East Bay Regional Park District as part of the public benefits of the project to offset the adverse impacts of the solid fill. (The Port had previously applied Doolittle Pond to

two other fill projects (BCDC Permits Nos. 4-74 and 2-77) whose net earth and pile-supported fills totaled 2.59 acres. Although it was not called a mitigation bank at the time, using the same parcel to offset the impacts of more than one project is the basic principle of mitigation banks. See Chapter V for a discussion of mitigation banks.)

The second example is a permit issued to Jensen and Reynolds Holding Company in Benicia (BCDC Permit No. 15-79). This project involved placing earth fill on 4.24 acres of tidal marsh to construct a barge terminal and fabrication yard for large steel structures to be used in oil exploration. The applicant consulted with the Department of Fish and Game, the U.S. Fish and Wildlife Service, and BCDC to determine appropriate compensation for the fill's impacts. The Habitat Evaluation Procedure (HEP)^{4/} was used to quantify the habitat value of both the proposed fill site and the preferred mitigation site. Based on the HEP analysis, the applicant proposed and the Commission subsequently required offsetting the adverse impacts of the fill by acquiring and enhancing the equivalent of 20 acres

that is (a) not now subject to tidal action; (2) is not now used for the solar evaporation of sea water in the course of salt production; and (3) was diked-off from the Bay prior to September 17, 1965....[T]he applicant may participate in other larger scale marsh or Bay restoration projects, preferably in or adjacent to the Carquinez Strait, by private or public parties or agencies...provided that the contribution by the permittee in land, money, or work...is at least equivalent in value to the cost of acquisition of approximately 20 acres of diked-off land meeting the criteria referenced above.

^{4/} See pages 49-53 of the BCDC "Staff Report on Fill Controls" for a detailed discussion of HEP procedures.

CHAPTER V. MITIGATION GUIDEBOOK

Introduction

This guidebook is intended to assist the Commission, its staff, applicants, and interested parties in determining when, how much, and what type of mitigation will be required of projects involving fill in San Francisco Bay.

The purpose of mitigation is to offset the specific adverse environmental impacts of a project. Because of the many variables in site conditions, project details, environmental impacts, and other circumstances, it is impractical to establish precise mitigation standards that can be applied to all situations. For this reason, this guidebook presents neither a formula nor a method for determining precisely how much and what kind of mitigation will be required for a particular fill project, nor any new mitigation policies or standards. However, in order to provide greater predictability to an applicant in proposing a mitigation project to the Commission, this guidebook identifies the kinds of fill projects that have generally provided mitigation, as well as the kinds of mitigation that have been provided to offset the adverse impacts of fill.

This guidebook is designed to promote an understanding of how the Commission has applied its mitigation policy by discussing representative examples of mitigation provided by fill projects over the last 15 years. Understanding how the Commission has applied its mitigation policies in the

past should help readers of this guidebook determine when, how much, and what kind of mitigation is likely to be required for a particular fill project in the future.

Floating Fill

Floating fill is designed to float at all or most tidal stages. Examples of floating fill include boat docks, historic ships, drydocks, floating breakwaters, vessels moored for extended periods of time, and pedestrian walkways on floats.

1. Environmental Impacts. Generally, floating fills can impact the Bay by:

- blocking sunlight, thereby eliminating marsh plants and reducing photosynthesis in benthic (bottom dwelling) organisms.
- reducing wave energy, which can increase the rate of siltation and affect tidal circulation and currents.
- reducing oxygen exchange by decreasing the amount of Bay surface area available for such exchange.

2. Typical Mitigation Requirements

a. Boat Docks. Mitigation has rarely been required for boat docks, whether proposed singly in conjunction with a single-family residence or in large numbers as part of a marina development. The Commission has required mitigation for boat docks, however, when either construction or use of the dock(s) could adversely impact a sensitive or endangered wildlife

resource, such as harbor seals or herring spawning. Mitigation in these instances has been to restrict construction and/or use of the dock(s) to times which avoid interference with wildlife use of the area.

b. Vessels Moored for Extended Periods. The Commission has not required mitigation for the permanent or long-term mooring of nonrecreational vessels such as historic ships, houseboats, or barges. Though not requiring mitigation, the Commission has expressed concern that the long-term mooring of these vessels will impact the benthic community by resting on the Bay bottom at low tide, or by increasing sedimentation rates, and has limited the term of some of these fills so that their environmental impacts can be monitored.

c. Dry Docks. Mitigation has been required for both drydocks authorized by the Commission. Mitigation has taken the form of removing existing deteriorated piers and pilings at the project site. In addition, the Commission has limited the term of these permits to ten years or less.

Submerged Fill

Submerged fills are those fills that are predominantly under water. Examples of submerged fills include storm water outfall pipes, pipelines, riprap, breakwaters, and public access facilities such as tidal stairs and boat launch ramps.

1. Environmental Impacts. The environmental impacts of submerged fill include:

- changes in substrate which can significantly affect the kinds and number of benthic organisms that live in an area.

- alteration of currents and circulation patterns which can affect the rate of sedimentation (breakwaters).
- resuspension of sediments and pollutants if dredging is involved (pipelines and outfalls).
- alteration of the natural process of shoreline erosion and accretion (riprap, bulkheads, and breakwaters).

2 Typical Mitigation Requirements

a. Riprap. The Commission has not required mitigation for riprap, though the Commission typically conditions such permits to assure that fill placed for riprap creates a permanent, stable, and safe shoreline requiring little future maintenance.

b. Storm Drains, Pipelines, and Outfall Pipes. Mitigation has rarely been required for the installation of storm drains, pipelines, and outfall pipes. However, when construction will impact existing marsh vegetation or mudflats, the Commission typically requires adoption of construction practices that will minimize disturbance to the existing habitat and the restoration of the site to preproject conditions, including planting disturbed areas if they have not naturally revegetated within a year of project completion.

c. Breakwaters and Groins. The Commission has not required mitigation for breakwaters or groins.

d. Public Access. Mitigation has not been required for the various submerged fills authorized by the Commission to improve public access, such as tidal stairs, boat launching ramps, or beach replenishment projects.

Pile-Supported Fill

Pile-supported fills are fills supported above water by pilings. Under the Commission's law, the McAteer-Petris Act, both the pilings and the structure supported over water by pilings are fill. The Commission has approved pile-supported fill for marine terminals, boat docks, bridges, public access boardwalks, and buildings which extend partially over the Bay.

1. Environmental Impacts. Generally, the adverse environmental impacts of pile-supported fill are similar to those of floating fill, including:

- disruption and displacement of existing benthic communities.
- pile-supported fill creates shade, which can affect water and soil temperature and influence an area's plant and animal communities.
- pilings dampen wave energy and create eddies which can alter water circulation and can increase the rate of sedimentation.
- pile-supported fill can disrupt animal use of an area and animal movement between areas.

2. Typical Mitigation Requirements

a. Public Access

- Mitigation has generally not been required for small (less than 2,500 square feet) pile-supported public access facilities (such as boardwalks, fishing piers, and observation decks). In a few permits

authorizing pile-supported public access fill, however, the Commission expressed concern that project construction would result in increased human and pet disturbance of neighboring marshes. Such impacts have been mitigated by excavating channels to form a water barrier between public access areas and the neighboring marsh to reduce the likelihood of such intrusions.

- Large pile-supported public access fills (7000 square feet or more) have all involved removal of substantial amounts of existing Bay fill so that each project resulted in a net increase in Bay surface area.

- b. Boat Docks. Mitigation has not been required for pile-supported structures associated with boat docks. However, such fills have generally been small (less than 9,000 square feet) and have often involved removal of existing pile-supported fill to make room for the newly authorized pile-supported facility, a public benefit recognized by the Commission.

c. Buildings. Mitigation is required for buildings covering 1,000 square feet or more of Bay surface area. In the past, mitigation has typically involved the on-site removal of existing, pile-supported Bay fill that is equal to or greater in size than the proposed fill. When on-site fill removal has been infeasible, the Commission has required mitigation in the form of creating a tidal marsh to an area equal in size to the proposed pile-supported fill.

d. Bridges. Nearly all Commission permits for pile-supported bridges have provided mitigation. Mitigation required by the Commission has included:

- Enhancing habitat values on existing degraded tidal marshes by excavating channels and improving tidal circulation. Such enhancement projects have always involved improvements to an area significantly larger than the proposed pile-supported bridge.
- Contributing funds on a pro-rata basis to a mitigation bank where the amount of the contribution is directly related to the

cost of acquiring, restoring, monitoring, and maintaining a specific parcel to tidal action.

- Excavating an adjoining upland area so that an area equal in size to the proposed bridge will be at suitable elevations and topography so as to promote the establishment and maintenance of a tidal marsh.

The one pile-supported bridge that did not provide mitigation was approved early in the Commission's mitigation experience and involved construction of a bridge at the far inland end of a tidal flood control channel. The purpose of the bridge was to provide access to a 156 acre public shoreline recreation area, a public benefit the Commission found sufficient to offset the adverse impacts of the fill.

e. Marine Terminals, Wharves, and Water-Related

Industry. Mitigation has been required for nearly every project involving the construction of pile-supported fill for marine terminals, industrial wharves, and water-related industry. Approved mitigation has taken various forms, including:

- Removal of existing pile-supported fill at or near the project site.
- Performing extensive cleanup of shoreline debris.
- Removal of earth fill to facilitate restoration of a like-sized area to tidal marsh
- Contributing to a mitigation bank
- Enhancing habitat values on existing degraded tidal marshes.

Earth Fill

Earth fills are solid fills placed in tidal areas to create dry land. The Commission has approved earth fill for marine terminals, water-related industry, marinas, exploratory natural gas wells, levees, roadways, and public access.

1. Environmental Impacts. Of the various kinds of fill, earth fills have the most dramatic impact on the Bay. Earth fill transforms an existing tidal area to upland. Such fills can potentially have serious impacts on the Bay, including:

- destruction of fish and wildlife habitat and disruption of the ecological balance of the Bay.
- reduction of the Bay's surface area and volume thus decreasing the Bay's ability to maintain adequate oxygen levels in its water, reducing the

amount of water available to assimilate wastes, and reducing the tidal prism that flushes wastes from the Bay.

- reduction in the climate moderating effects of the Bay thereby increasing the possibility of increased air pollution.

2. Typical Mitigation Requirements. Since 1974, nearly all earth fills approved by the Commission have offset the impacts of such fill either through mitigation or through project design that negates the adverse impacts of the fill on Bay resources. In nearly all cases, implementation of the mitigation measures has assured that the project resulted in creating wildlife resource values and areas equal to or greater than the values lost and the areas filled. Mitigation approved for solid fills has included:

- Excavating existing uplands at the project site to create a tidal marsh with suitable topography and hydrology to promote a diversity of salt marsh habitats.
- Performing extensive cleanup of shoreline debris, including the removal of existing, deteriorated pile-supported, floating, and submerged fill.
- Contributing funds on a pro-rata basis to a mitigation bank or towards the acquisition and tidal restoration of an off-site parcel.

- Where proposed fill is placed to support a temporary use (such as drilling exploratory natural gas wells), removal of all fill material within a few months of completing the drilling.

In only a few instances has mitigation not been required for solid fill:

- When the proposed earth fill is small (less than 1,000 square feet) and there is no suitable on-site location for marsh restoration.
- When the proposed fill site has previously been filled but has subsided below the line of highest tidal action so that it is occasionally inundated by tidal waters.

Finding Mitigation Sites

The Commission's mitigation policy states that mitigation should "be at the fill project site, or if the Commission determines that on-site mitigation is not feasible, as close as possible." As illustrated by many of the permits cited in this guidebook, many applicants have designed their projects so that mitigation was provided at the project site. On-site mitigation has several advantages, including: (1) the applicant controls the land, and thus can coordinate any enhancement work with project construction; (2) the applicant has increased involvement with the mitigation site, thereby increasing the applicant's incentive for the mitigation to succeed; and (3) there is greater likelihood that the mitigation will offset the actual project impacts, as site location, soil and hydrological conditions, microclimate, etc. more closely mirror the habitat lost through filling.

However, even with the advantages of on-site mitigation, it is not always feasible or desirable for mitigation to take place on the project site. In some cases, land is not available for on-site mitigation. In other situations, on-site mitigation may result in creating a habitat that is too small, too isolated, or too continually disturbed to have a significant habitat value. In these instances, off-site mitigation may be necessary or preferable.

Unfortunately, it is becoming increasingly difficult to find mitigation sites in the San Francisco Bay Area simply because so much of the shoreline has either been developed, or already supports valuable wildlife resources. This scarcity of suitable mitigation sites has frustrated applicants and regulatory agencies alike in their efforts to offset a project's adverse environmental impacts. In recognition of the difficulty of finding mitigation sites, and to allow the greatest possible flexibility in providing mitigation, an increasing number of Commission permits have provided the applicant with several acceptable mitigation options. The two options that appear most frequently are on-site mitigation and contributions of monies to "mitigation banks."

Mitigation bank contributions usually involve applicants contributing funds on a pro-rata basis toward the cost of acquiring, restoring, maintaining, and monitoring a restored wetland site. In the San Francisco Bay Area, mitigation bank projects have consisted of restoring tidal action to an area that has been diked-off from the Bay, or enhancing an existing tidal wetland. Normally, the mitigation bank is acquired, enhanced, and maintained by some party other than the applicant.

Mitigation banks can eliminate the lag-time between habitat loss and habitat creation as the mitigation site is usually restored prior to project construction. Mitigation banks also allow applicants to determine their mitigation costs early in project development. Applicants contributing to a mitigation bank are assured that the mitigation they provide is comparable to mitigation provided by other projects contributing to the mitigation bank, thus answering the criticism that not all applicants are treated equitably. Because of these advantages, and because mitigation banks offer additional flexibility in meeting the public benefits test, the Commission has encouraged the development of mitigation banks and has approved two mitigation bank programs for San Francisco Bay. One is operated by the East Bay Regional Park District and involved the restoration of 200 acres along the Hayward shoreline; the other is operated by the State Coastal Conservancy and involved enhancing a 15 acre diked wetland at the mouth of Petaluma River. Unfortunately, these mitigation banks did not get beyond the approval stage. For both sites, the State Department of Fish and Game and the U.S. Fish and Wildlife Service determined that the site's existing wildlife values were so high that any proposed enhancement program would not substantially increase its value to wildlife. This determination led the Coastal Conservancy to abandon the Petaluma Mitigation Bank, while the East Bay Regional Park District is continuing to assess what course of action should be taken with their Hayward property.

The failure of these two mitigation bank programs is of great concern to all people interested in the future of San Francisco Bay. As suitable mitigation sites become increasingly unavailable, and without mitigation banks as a mitigation option, applicants for small, otherwise approvable fills will

be unable to offset the adverse impacts of their proposed project. Unless other acceptable ways for applicants to offset the adverse impacts of fill can be found, the Commission will then be faced with the difficult choice of either denying projects because the adverse impacts cannot be mitigated, or approving fill projects without any mitigation because mitigation is no longer feasible.

Organizations and Agencies Involved With Mitigation in San Francisco Bay

Regulatory Agencies

San Francisco Bay Conservation and
Development Commission
Thirty Van Ness Avenue, Room 2011
San Francisco, California 94102
(415) 557-3686

U. S. Army Corps of Engineers
San Francisco District
211 Main Street
San Francisco, California 94105
(415) 974-0416

Reviewing Agencies

Department of Fish and Game
Region III
P. O. Box 47
Yountville, California 94599
(707) 944-2011

Department of Fish and Game
Marine Patrol Branch Office
411 Burgess Drive,
Menlo Park, California 94025
(415) 326-0324

Environmental Protection Agency
Region IX
215 Fremont Street
San Francisco, California 94105
(415) 974-8071

National Marine Fisheries Service
Tiburon Laboratory
3150 Paradise Drive
Tiburon, California 94920
(415) 556-0565

U. S. Fish and Wildlife Service
2800 Cottage Way
Sacramento, California 95825
(916) 484-4731

Public Interest Groups

Bay Planning Coalition
666 Howard Street, Suite 301
San Francisco, California 94108
(415) 543-3830

Save San Francisco Bay Association
2140 Shattuck Avenue
Berkeley, California
(415) 849-3053

Organizations Involved in Purchase and Enhancement of Mitigation Sites

California Coastal Conservancy
1330 Broadway, Suite 1100
Oakland, California 94612
(415) 464-1015

Marin Open Space District
Civic Center
San Rafael, California 94903
(415) 499-6387

Midpeninsula Open Space District
Old Mill Office Center
Building C, Suite 135
201 San Antonio Circle
Mountain View, California 94040
(415) 949-5500

Sonoma Land Trust
P. O. Box 1211
Sonoma, California
(707) 938-9119

Trust for Public Lands
82 Second Street
San Francisco, California 94105
(415) 495-4014

East Bay Regional Park District
11500 Skyline Boulevard
Oakland, California 94619
(415) 531-9300

Peninsula Open Space Trust
3000 Sand Hill Road
Menlo Park, California 94025
(415) 854-7696

Nature Conservancy
California Field Office
785 Market Street
San Francisco, California 94103
(415) 777-0487